

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

Claims 1-16. (Cancelled)

17. (Currently Amended) The method of claim 32 or claim 33, wherein said molecule comprises between 24 and 100~~16 and 200~~ bp.

18. (Previously Presented) The method of claim 32 or claim 33, wherein said molecule is a linear or a hairpin nucleic acid molecule.

19. (Previously Presented) The method of claim 18, wherein said molecule is a hairpin nucleic acid molecule and wherein the loop comprises nucleic acid or chemical groups.

20. (Previously Presented) The method of claim 32 or claim 33, wherein at least one free end of said molecule is blunt or 5'- or 3'-protruding.

Claim 21. (Canceled)

22. (Previously Presented) The method of claim 32 or claim 33, wherein said molecule is capable of being up-taken by cell into the cell nucleus.

23. (Previously Presented) The method of claim 32 or claim 33, wherein said molecule comprises a phosphodiester backbone or a chemically modified phosphodiester backbone, or another backbone with one or several chemical groups.

24. (Previously Presented) The method of claim 32 or claim 33, wherein said molecule comprises a 2'-deoxynucleotide backbone, and optionally comprises one or several 2'-ribonucleotides or other modified nucleotides or nucleobases other than adenine, cytosine, guanine and thymine.

25. (Previously Presented) The method of claim 23, wherein said backbone comprises methylphosphonates, phosphoramidates, morpholino nucleic acid, 2'-O,4'-C methylene/ethylene bridged locked nucleic acid, peptide nucleic acid (PNA), short chain alkyl, or cycloalkyl intersugar linkages or short chain heteroatomic or heterocyclic intrasugar linkages of variable length.

26. (Previously Presented) The method of claim 32 or claim 33, wherein said molecule comprises one or several chemical groups at the end of each strand or, at least, at the 3' end of each strand.

27. (Previously Presented) The method of claim 26, wherein said molecule comprises one or several phosphorothioates at the end of each strand or, at least, at the 3' end of each strand.

28. (Previously Presented) The method of claim 32 or claim 33, wherein said molecule further comprises at least one embedded element, which hampers DNA replication or DNA repair, said at least one element being incorporated in the centre or at the end of the double-stranded molecule.

29. (Currently Amended) The method of claim ~~[[28]]~~19, wherein said ~~loop~~molecule comprises

a) a polyethyleneglycol chain or any hydrocarbon chain, optionally interrupted and/or substituted by one or more heteroatoms or heteroatomic or heterocyclic groups, comprising one or several heteroatoms; ~~and~~ or

b) a native oligonucleotide, ~~when used in the loop of an hairpin fragment,~~
~~preferably a tetradexythyridylate (T4).~~

30. (Previously Presented) The method of claim 32 or claim 33, wherein said molecule is made by chemical synthesis, semi-biosynthesis or biosynthesis.

Claim 31. (Canceled)

32. (Currently Amended) A method of enhancing tumor sensitivity to DNA damaging anticancer therapy, the method comprising administering to a subject a nucleic acid molecule, wherein said molecule comprises a double stranded portion of at least ~~[[16]]~~24 bp, has at least one free end, and wherein said molecule is substrate for binding by at least a Ku protein involved in the NHEJ pathway of double strand breaks repair.

33. (Currently Amended) A method of treating cancer, the method comprising administering to a subject a nucleic acid molecule, wherein said molecule comprises a double stranded portion of at least ~~[[16]]~~24 bp, has at least one free end, and wherein said molecule is substrate for binding by at least a Ku protein involved in the NHEJ pathway of double strand breaks repair, in combination with a DNA damaging anticancer therapy.

34. (Previously Presented) The method of claim 33, wherein the DNA damaging anticancer therapy is selected from radiotherapy and chemotherapy.

35. (Previously Presented) The method of claim 34, wherein the molecule is administered prior to radiotherapy.

36. (Previously Presented) The method of claim 34, wherein the molecule is administered prior to or along with chemotherapy.

37. (Previously Presented) The method of claim 32, wherein the cancer is selected from glioblastoma, breast cancer and cervical cancer.

38. (Previously Presented) The method of claim 32, wherein the molecule is administered by intravenous, intra-tumoral or sub-cutaneous injection, or by oral route.

Claim 39. (Canceled)

40. (new) The method of claim 29, wherein said native oligonucleotide is a tetradexythyridylate.

41. (new) The method of claim 32 or claim 33, wherein said molecule is 32 bp.